

LISTING OF THE CLAIMS

1. (Currently amended) ~~A modified glycosaminoglycan, wherein the modified glycosaminoglycan comprises a~~ modified glycosaminoglycan comprising a glycosaminoglycan in which at least one hydroxyl group present in the molecular structure of the glycosaminoglycan has been chemically substituted with modified so that oxygen atom of the hydroxyl group is covalently bound to a hydrazide-reactive group or an aminooxy-reactive group instead of a hydrogen atom.

2. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 1, wherein the glycosaminoglycan comprises chondroitin, chondroitin sulfate, dermatan, dermatan sulfate, heparin, or heparan sulfate.

3. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 1, wherein the glycosaminoglycan comprises hyaluronan.

4. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 3, wherein the at least one hydroxyl group is a primary C-6 hydroxyl group of a contained within an N-acetyl-glucosamine residue present in the molecular structure of the hyaluronan ~~is substituted with the hydrazide-reactive group or the aminooxy-reactive group.~~

5. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 4, wherein at least one secondary hydroxyl group ~~is substituted with~~ present in the molecular structure of the hyaluronan has also been modified so that the oxygen atom of the secondary hydroxyl group is covalently bound to the hydrazide-reactive group or the aminooxy-reactive group.

6. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 4, wherein ~~from one primary C-6 hydroxyl group of the N-acetyl-glucosamine residue up to 100 % of the primary C-6 hydroxyl groups of the N-acetyl-glucosamine residue are~~

substituted residues in the glycosaminoglycan structure are chemically modified so that the hydrogen atom of each hydroxyl group is replaced with the hydrazide-reactive group or the aminoxy-reactive group.

7. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 1, wherein the at least one hydroxyl group comprises is a primary C-6 hydroxyl group ~~of contained within~~ the non-uronic acid sugar component of the repeating disaccharide of the glycosaminoglycan.

8. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 1, wherein the hydrazide-reactive group or the aminoxy-reactive group ~~comprises a carboxylic group or the salt or ester thereof.~~ is selected from carboxyl, a carboxylate salt, and a carboxylic acid ester.

9. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 1, wherein the hydrazide-reactive group or the aminoxy-reactive group ~~comprises~~ has the formula -L-CO₂H ~~or the~~ is a salt or ester thereof, wherein L comprises ~~a substituted or unsubstituted hydrocarbyl group, a substituted or unsubstituted heterohydrocarbyl group, a polyalkylene group, a polyether group, a polyamide group, a polyimino group, an aryl group, a polyester, a polythioether group, a polysaccharyl group, or a combination thereof~~ an unsubstituted hydrocarbyl group, an unsubstituted heterohydrocarbyl group, a substituted hydrocarbyl group, and a substituted heterohydrocarbyl group.

10. (Currently amended) ~~The modified glycosaminoglycan~~ modified glycosaminoglycan of claim 9, wherein L comprises a polyalkylene group having the formula (CH₂)_n wherein n is from 1 to 10.

Cancel claims 11-13.

14. (Currently amended) A method for making a ~~modified glycosaminoglycan~~ modified glycosaminoglycan, comprising (a) reacting a glycosaminoglycan with a base to produce

~~deprotonated glycosaminoglycan~~ a deprotonated glycosaminoglycan, and (b) reacting the ~~deprotonated glycosaminoglycan~~ deprotonated glycosaminoglycan with a compound ~~comprising~~ containing at least one hydrazide-reactive group or aminooxy-reactive group.

Cancel claims 15-23.

24. (Currently amended) A ~~modified glycosaminoglycan~~ modified glycosaminoglycan made by the process of claim 14.

25. (Currently amended) The modified glycosaminoglycan of claim 24, comprising two or more hydrazide groups.

Cancel claims 26-44.

45. (Currently amended) ~~A method for making a compound~~ The method of claim 14, further comprising, after step (b), reacting the modified glycosaminoglycan of claims 1-13 and 24 modified glycosaminoglycan with a hydrazide compound, to provide a further modified glycosaminoglycan.

46. (Currently amended) ~~A method for making a compound~~ The method of claim 14, further comprising, after step (b), reacting the modified glycosaminoglycan of claims 1-13 and 24 modified glycosaminoglycan with an aminooxy ether compound, to provide a further modified glycosaminoglycan.

47. (Currently amended) The ~~compounds~~ further modified glycosaminoglycans produced by the methods of claims 45 or 46.

Cancel claim 48.

49. (Currently amended) The compound of claim-48231, wherein the macromolecule comprises an oligonucleotide, a nucleic acid or a metabolically stabilized analogue thereof, a polypeptide, a lipid, a glycoprotein, a glycolipid, or a pharmaceutically-acceptable compound.

50. (Currently amended) The compound of claim-48231, wherein the macromolecule comprises a polysaccharide, a protein, or a synthetic polymer.

51. (Currently amended) The compound of claim 50, wherein the macromolecule comprises ~~a polysaccharide, wherein the polysaccharide comprises a sulfated glycosaminoglycan~~ a sulfated glycosaminoglycan.

52. (Currently amended) The compound of claim-48231, wherein the macromolecule comprises chondroitin, chondroitin sulfate, dermatan, dermatan sulfate, heparin, heparan sulfate, alginic acid, pectin, or carboxymethylcellulose.

53. (Currently amended) The compound of claim-48231, wherein the macromolecule comprises hyaluronan.

54. (Currently amended) The compound of claim-48231, wherein Z comprises a polyether.

55. (Currently amended) The compound of claim-48231, wherein R', R², R⁵, R⁶, R⁷, and R⁸ are hydrogen.

Cancel claims 56-60.

61. A method for producing ~~a compound~~ crosslinked glycosaminoglycan, comprising reacting ~~(1) the compound of claims 25-44 or 47 with (2) claim 25 with a polycarbonyl~~ crosslinker.

Cancel claim 62-198.

199. (Currently amended) A pharmaceutical composition comprising a bioactive agent ~~and the compound or composition in any of claims 1-13, 24-44, 48-60, 62-68, 71-82, 84-98, 117-127, or 150-198~~ a modified glycosaminoglycan in which at least one hydroxyl group has been modified so as to replace the hydrogen atom of the group with a hydrazide-reactive group or an aminooxy-reactive group, or a crosslinked such modified glycosaminoglycan

200. (Currently amended) A pharmaceutical composition comprising a living cell and ~~the compound or composition in any of claims 1-13, 24-44, 48-60, 62-68, 71-82, 84-98, 117-127, or 150-198~~ a modified glycosaminoglycan in which at least one hydroxyl group has been modified so as to replace the hydrogen atom of the group with a hydrazide-reactive group or an aminooxy-reactive group, or a crosslinked such modified glycosaminoglycan.

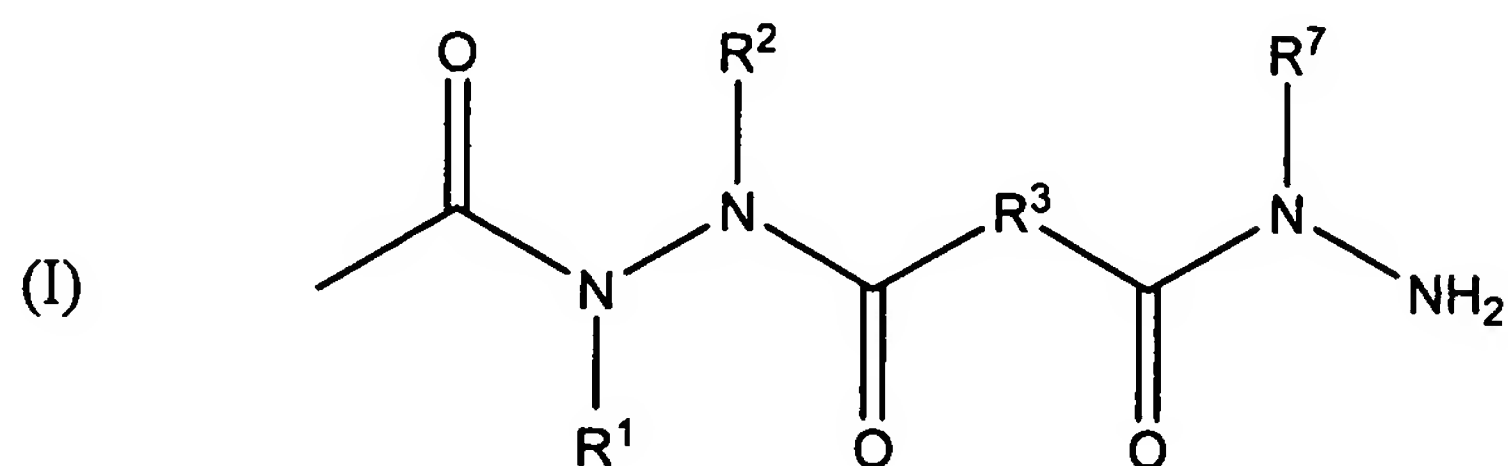
201. (Currently amended) A method for improving wound healing in a subject in need of such improvement, comprising contacting the wound of the subject with ~~the compound or composition in any of claims 1-13, 24-44, 48-60, 62-68, 71-82, 84-98, 117-127, or 150-198~~ a modified glycosaminoglycan in which at least one hydroxyl group has been modified so as to replace the hydrogen atom of the group with a hydrazide-reactive group or an aminooxy-reactive group, or a crosslinked such modified glycosaminoglycan.

202. (Currently amended) A method for delivering at least one bioactive agent to a patient in need of such delivery, comprising contacting at least one tissue capable of receiving the bioactive compound with ~~the compound or composition in any of claims 1-13, 24-44, 48-60, 62-68, 71-82, 84-98, 117-127, or 150-198.~~ of claim 199

203. (Currently amended) A method for delivering living cells to a patient in need of such delivery, comprising contacting at least one tissue capable of receiving the living cells with ~~the compound or composition in any of claims 1-13, 24-44, 48-60, 62-68, 71-82, 84-98, 117-127, or 150-198~~ composition of claim 200.

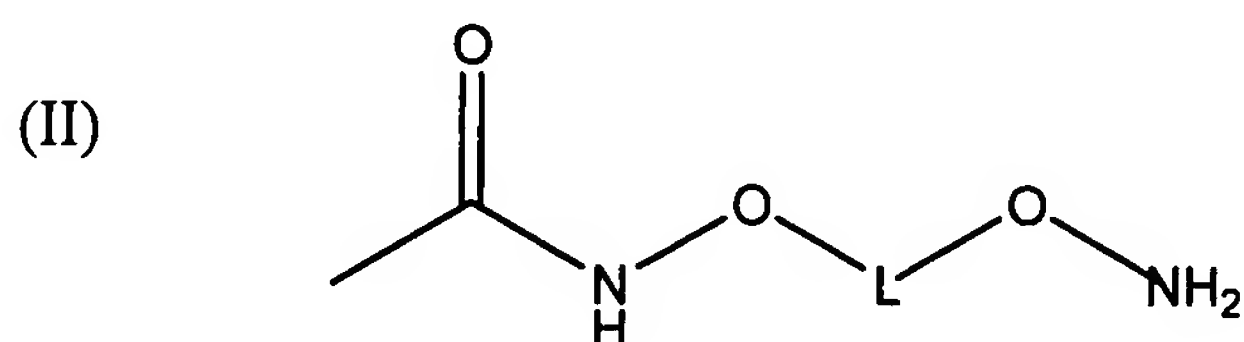
Cancel claims 204-223.

224. (New) The modified glycosaminoglycan of claim 1 or claim 24, containing at least one substituent having the structure of formula (I)



wherein R^1 , R^2 , and R^7 are independently selected from hydrogen, hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl, and R^3 is selected from hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl.

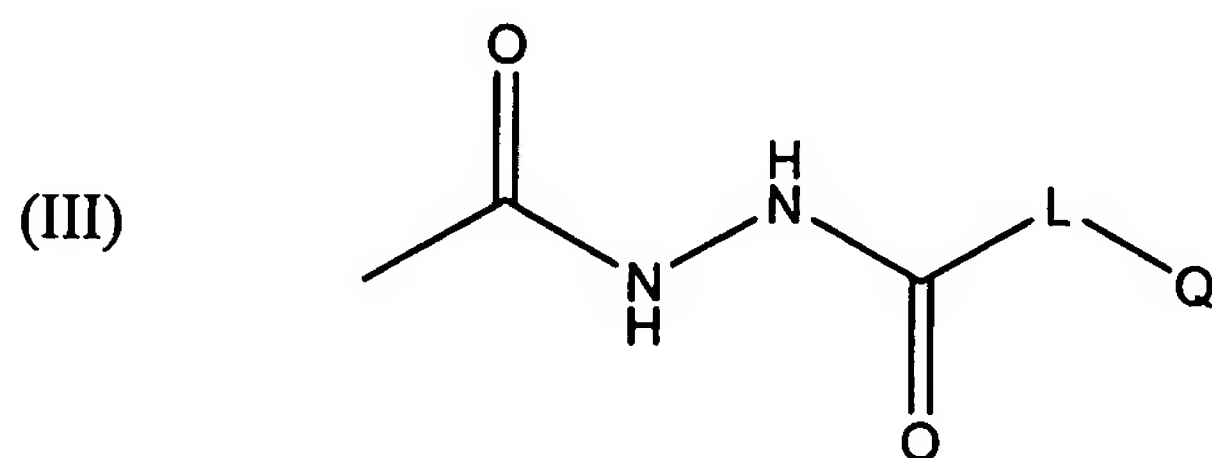
225. (New) The modified glycosaminoglycan of claim 1 or claim 24, containing at least one substituent having the structure of formula (II)



wherein L is selected from hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl.

226. (New) The modified glycosaminoglycan of claim 225, wherein L is selected from polyether, polyamide, polyimino, aryl, polyester, polythioether, polysaccharyl, and combinations thereof.

227. (New) The modified glycosaminoglycan of claim 1 or claim 24, containing at least one substituent having the structure of formula (III)



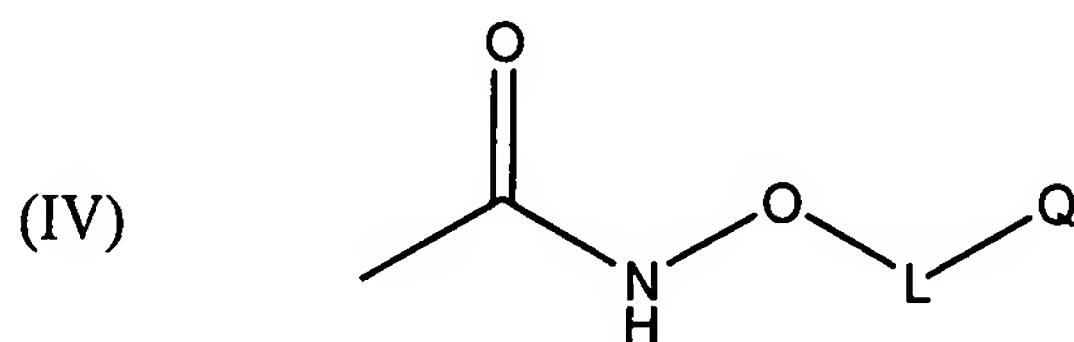
wherein:

L is selected from hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl; and

Q is a bioactive agent, an SH group, or a thiol-reactive electrophilic functional group.

228. (New) The modified glycosaminoglycan of claim 227, wherein L is selected from polyether, polyamide, polyimino, aryl, polyester, polythioether, polysaccharyl, and combinations thereof.

229. (New) The modified glycosaminoglycan of claim 1 or claim 24, containing at least one substituent having the structure of formula (IV)



wherein:

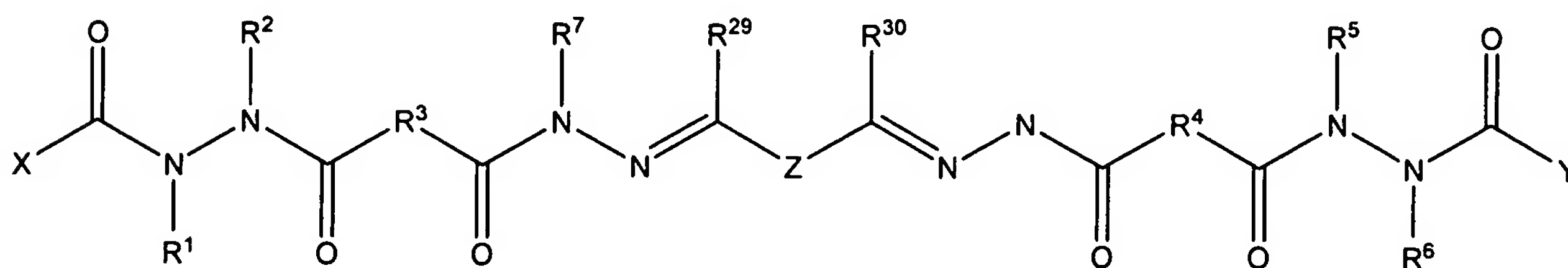
L is selected from hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl; and

Q is a bioactive agent, an aminooxy group, an SH group, or a thiol-reactive electrophilic functional group.

230. (New) The modified glycosaminoglycan of claim 229, wherein L is selected from polyether, polyamide, polyimino, aryl, polyester, polythioether, polysaccharyl, and combinations thereof.

231. (New) A compound having the structure of formula (V)

(V)



wherein:

X is a macromolecule;

Y is a modified glycosaminoglycan in which at least one hydroxyl group has been modified so as to replace the hydrogen atom of the group with a hydrazide-reactive group or an aminooxy-reactive group;

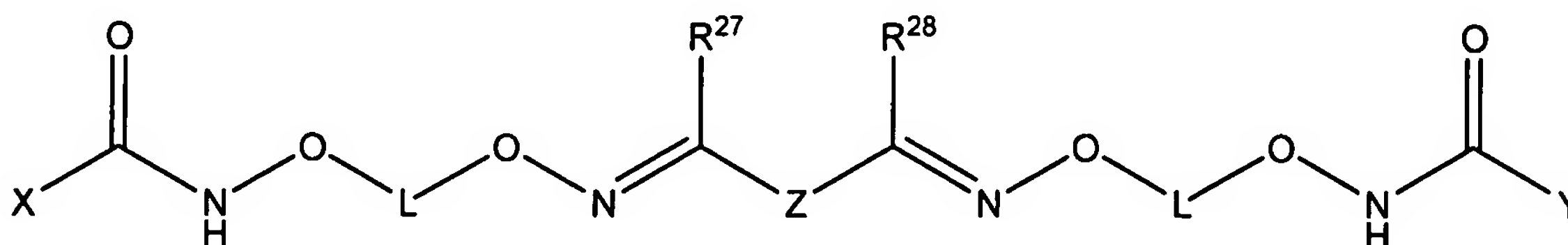
R^{29} and R^{30} are independently selected from hydrogen and lower alkyl;

R^1 , R^2 , R^5 , R^6 , R^7 , and R^8 are independently selected from hydrogen, hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl; and

Z, R^3 , and R^4 are independently selected from hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl.

232. (New) A compound having the structure of formula (VI)

(VI)



wherein:

X and Y are macromolecules;

R^{27} and R^{28} are independently selected from hydrogen and lower alkyl;

L and Z are independently selected from hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl.

233. (New) The compound of claim 232, wherein L and Z are independently selected from polyether, polyamide, polyimino, aryl, polyester, polythioether, polysaccharyl, and combinations thereof.

234. (New) A compound comprising at least one fragment having the structure Y-S-S-G, wherein Y is a modified glycosaminoglycan in which at least one hydroxyl group has been modified so as to replace the hydrogen atom of the group with a hydrazide-reactive group or an aminooxy-reactive group, and G comprises a residue of a thiolated compound.

235. (New) A compound comprising at least one fragment having the structure Y-(CO)-NH-NH-(CO)-L-S-S-G, wherein:

L is selected from hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl, and substituted heterohydrocarbyl;

Y is a modified glycosaminoglycan in which at least one hydroxyl group has been modified so as to replace the hydrogen atom of the group with a hydrazide-reactive group or an aminooxy-reactive group; and

G comprises a residue of a thiolated compound.

236. (New) The compound of claim 235, wherein L is selected from polyether, polyamide, polyimino, aryl, polyester, polythioether, polysaccharyl, and combinations thereof.